

PATENT COOPERATION TREATY

PCT

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

Assistant Commissioner for Patents
United States Patent and Trademark
Office
Box PCT
Washington, D.C. 20231
ETATS-UNIS D'AMERIQUE

in its capacity as elected Office

Date of mailing (day/month/year) 16 February 2000 (16.02.00)	
International application No. PCT/US98/09710	Applicant's or agent's file reference 31470-PCT
International filing date (day/month/year) 13 May 1998 (13.05.98)	Priority date (day/month/year)
Applicant KAO, Imin et al	

1. The designated Office is hereby notified of its election made:

☒ in the demand filed with the International Preliminary Examining Authority on:
10 December 1999 (10.12.99)

☐ in a notice effecting later election filed with the International Bureau on:

2. The election ☒ was

☐ was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland

Facsimile No.: (41-22) 740.14.35

Authorized officer

F. Baechler

Telephone No.: (41-22) 338.83.38

BEST AVAILABLE COPY

PATENT COOPERATION TREATY

From the INTERNATIONAL SEARCHING AUTHORITY

To: HENRY TANG
BAKER AND BOTTS, LLP
30 ROCKEFELLER PLAZA
NEW YORK, NY 10112-0228

PCT

NOTIFICATION OF CHANGE IN
ABSTRACT AS PREVIOUSLY ESTABLISHED
BY INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 38.2(b)
and Administrative Instructions, Section 515)

Date of Mailing
(day/month/year) 29 OCT 1998

Applicant's or agent's file reference
31470-PCT

INFORMATION ONLY

International application No.
PCT/US98/09710

International filing date
(day/month/year) 13 MAY 1998

Applicant
THE RESEARCH FOUNDATION OF STATE UNIVERISTY OF NEW YORK

RECEIVED
BAKER & BOTTS, L.L.P.
98 NOV -3 PM 4: 09

The applicant is hereby notified that this International Search Authority has considered the comments received from the applicant on the abstract established by this Authority (Form PCT/ISA/210) and has decided that:

- ☐ the text of the abstract remains as previously established by this Authority for the reasons indicated below/in the Annex.
- ☒ the text of the abstract is changed in view of the applicant's comments and it now reads as it appears below/in the Annex.

The technical features mentioned in the abstract do not include a reference sign between parentheses (PCT Rule 8.1(d)).

The abstract is too long (PCT Rule 8.1(b)). The abstract must be less than 150 words, or 200 words when no Figure is to be published.

NEW ABSTRACT

A method and apparatus for surface measurement using the shadow moire effect with the Talbot effect. The apparatus (10) includes a specimen mount (18) to receive a specimen (12) having a surface (14) to be measured, and a reference grating (22) mounted adjacent the specimen mount (18) so as to be substantially parallel to a mean surface plane (16) of the specimen (12). The reference grating (22) is mounted in such a manner that the distance between the reference grating (22) and the mean surface plane (16) of the specimen (16) can be adjusted to a Talbot distance δT . The apparatus also includes a light source (24) to illuminate the specimen (12) through the grating (22), and a detector (36) positioned to detect the moire fringes produced by

A copy of this Notification and any Annex has been sent to the International Bureau.

Name and mailing address of the ISA/US
Commissioner of Patents and Trademarks
Box PCT
Washington, D.C. 20231

Facsimile No. (703) 305-3230

Authorized officer

RICHARD ROSENBERGER

Telephone No. (703) 308-0956



REQUEST

The undersigned requests that the present international application be processed according to the Patent Cooperation Treaty.

for receiving Office use only

International Application No.

International Filing Date

Name of receiving Office and "PCT International Application"

Applicant's or agent's file reference
(if desired) (12 characters maximum) 31470-PCT

Box No. I TITLE OF INVENTION

SURFACE MEASUREMENT USING SHADOW MOIRE TECHNIQUE WITH TALBOT EFFECT

Box No. II APPLICANT

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (i.e. country) of residence if no State of residence is indicated below.)

THE RESEARCH FOUNDATION OF STATE UNIVERSITY OF NEW YORK
P.O. Box 9
Albany, NY 12201-0009
US

☐ This person is also inventor.

Telephone No.

Facsimile No.

Teleprinter No.

State (i.e. country) of nationality:
US

State (i.e. country) of residence:
US

This person is applicant for the purposes of: ☐ all designated States ☒ all designated States except the United States of America ☐ the United States of America only ☐ the States indicated in the Supplemental Box

Box No. III FURTHER APPLICANT(S) AND/OR (FURTHER) INVENTOR(S)

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (i.e. country) of residence if no State of residence is indicated below.)

KAO, IMIN
17 Botany Lane
Stony Brook, NY 11790
US

This person is:

☐ applicant only

☒ applicant and inventor

☐ inventor only (If this check-box is marked, do not fill in below.)

State (i.e. country) of nationality:
US

State (i.e. country) of residence:
US

This person is applicant for the purposes of: ☐ all designated States ☐ all designated States except the United States of America ☒ the United States of America only ☐ the States indicated in the Supplemental Box

☒ Further applicants and/or (further) inventors are indicated on a continuation sheet.

Box No. IV AGENT OR COMMON REPRESENTATIVE; OR ADDRESS FOR CORRESPONDENCE

The person identified below is hereby/has been appointed to act on behalf of the applicant(s) before the competent International Authorities as:

☒ agent ☐ common representative

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)

TANG, HENRY and
OTTERSTEDT, PAUL J.
Baker & Botts, LLP
30 Rockefeller Plaza
New York, NY 10112-0228
US

Telephone No.
(212) 705-5000

Facsimile No.
(212) 705-5020

Teleprinter No.

☐ Mark this check-box where no agent or common representative is/has been appointed and the space above is used instead to indicate a special address to which correspondence should be sent.

Continuation of Box No. III FURTHER APPLICANTS AND/OR (FURTHER) INVENTORS

If none of the following sub-boxes is used, this sheet is not to be included in the request.

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (i.e. country) of residence if no State of residence is indicated below.)

CHIANG, FU-PEN
29 Acorn Lane
Stony Brook, NY 11790
US

This person is:

- ☐ applicant only
☒ applicant and inventor
☐ inventor only (If this check-box is marked, do not fill in below.)

State (i.e. country) of nationality:
US

State (i.e. country) of residence:
US

This person is applicant for the purposes of: ☐ all designated States ☐ all designated States except the United States of America ☒ the United States of America only ☐ the States indicated in the Supplemental Box

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (i.e. country) of residence if no State of residence is indicated below.)

This person is:

- ☐ applicant only
☐ applicant and inventor
☐ inventor only (If this check-box is marked, do not fill in below.)

State (i.e. country) of nationality:

State (i.e. country) of residence:

This person is applicant for the purposes of: ☐ all designated States ☐ all designated States except the United States of America ☐ the United States of America only ☐ the States indicated in the Supplemental Box

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (i.e. country) of residence if no State of residence is indicated below.)

This person is:

- ☐ applicant only
☐ applicant and inventor
☐ inventor only (If this check-box is marked, do not fill in below.)

State (i.e. country) of nationality:

State (i.e. country) of residence:

This person is applicant for the purposes of: ☐ all designated States ☐ all designated States except the United States of America ☐ the United States of America only ☐ the States indicated in the Supplemental Box

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (i.e. country) of residence if no State of residence is indicated below.)

This person is:

- ☐ applicant only
☐ applicant and inventor
☐ inventor only (If this check-box is marked, do not fill in below.)

State (i.e. country) of nationality:

State (i.e. country) of residence:

This person is applicant for the purposes of: ☐ all designated States ☐ all designated States except the United States of America ☐ the United States of America only ☐ the States indicated in the Supplemental Box

☐ Further applicants and/or (further) inventors are indicated on another continuation sheet.

Box No.V DESIGNATION OF STATES

The following designations are hereby made under Rule 4.9(a) (mark the applicable check-boxes; at least one must be marked):

Regional Patent

- ☐ **AP ARIPO Patent:** GH Ghana, GM Gambia, KE Kenya, LS Lesotho, MW Malawi, SD Sudan, SZ Swaziland, UG Uganda, ZW Zimbabwe, and any other State which is a Contracting State of the Harare Protocol and of the PCT
- ☐ **EA Eurasian Patent:** AM Armenia, AZ Azerbaijan, BY Belarus, KG Kyrgyzstan, KZ Kazakhstan, MD Republic of Moldova, RU Russian Federation, TJ Tajikistan, TM Turkmenistan, and any other State which is a Contracting State of the Eurasian Patent Convention and of the PCT
- ☐ **EP European Patent:** AT Austria, BE Belgium, CH and LI Switzerland and Liechtenstein, DE Germany, DK Denmark, ES Spain, FI Finland, FR France, GB United Kingdom, GR Greece, IE Ireland, IT Italy, LU Luxembourg, MC Monaco, NL Netherlands, PT Portugal, SE Sweden, and any other State which is a Contracting State of the European Patent Convention and of the PCT
- ☐ **OA OAPI Patent:** BF Burkina Faso, BJ Benin, CF Central African Republic, CG Congo, CI Côte d'Ivoire, CM Cameroon, GA Gabon, GN Guinea, ML Mali, MR Mauritania, NE Niger, SN Senegal, TD Chad, TG Togo, and any other State which is a member State of OAPI and a Contracting State of the PCT (if other kind of protection or treatment desired, specify on dotted line)


National Patent (if other kind of protection or treatment desired, specify on dotted line):

- | | |
|--|--|
| <input type="checkbox"/> AL Albania | <input type="checkbox"/> LT Lithuania |
| <input type="checkbox"/> AM Armenia | <input type="checkbox"/> LU Luxembourg |
| <input type="checkbox"/> AT Austria | <input type="checkbox"/> LV Latvia |
| <input type="checkbox"/> AU Australia | <input type="checkbox"/> MD Republic of Moldova |
| <input type="checkbox"/> AZ Azerbaijan | <input type="checkbox"/> MG Madagascar |
| <input type="checkbox"/> BA Bosnia and Herzegovina | <input type="checkbox"/> MK The former Yugoslav Republic of Macedonia |
| <input type="checkbox"/> BB Barbados | <input type="checkbox"/> MN Mongolia |
| <input type="checkbox"/> BG Bulgaria | <input type="checkbox"/> MW Malawi |
| <input type="checkbox"/> BR Brazil | <input type="checkbox"/> MX Mexico |
| <input type="checkbox"/> BY Belarus | <input type="checkbox"/> NO Norway |
| <input checked="" type="checkbox"/> CA Canada | <input type="checkbox"/> NZ New Zealand |
| <input type="checkbox"/> CH and LI Switzerland and Liechtenstein | <input type="checkbox"/> PL Poland |
| <input type="checkbox"/> CN China | <input type="checkbox"/> PT Portugal |
| <input type="checkbox"/> CU Cuba | <input type="checkbox"/> RO Romania |
| <input type="checkbox"/> CZ Czech Republic | <input type="checkbox"/> RU Russian Federation |
| <input type="checkbox"/> DE Germany | <input type="checkbox"/> SD Sudan |
| <input type="checkbox"/> DK Denmark | <input type="checkbox"/> SE Sweden |
| <input type="checkbox"/> EE Estonia | <input type="checkbox"/> SG Singapore |
| <input type="checkbox"/> ES Spain | <input type="checkbox"/> SI Slovenia |
| <input type="checkbox"/> FI Finland | <input type="checkbox"/> SK Slovakia |
| <input type="checkbox"/> GB United Kingdom | <input type="checkbox"/> SL Sierra Leone |
| <input type="checkbox"/> GE Georgia | <input type="checkbox"/> TJ Tajikistan |
| <input type="checkbox"/> GH Ghana | <input type="checkbox"/> TM Turkmenistan |
| <input type="checkbox"/> GM Gambia | <input type="checkbox"/> TR Turkey |
| <input type="checkbox"/> GW Guinea-Bissau | <input type="checkbox"/> TT Trinidad and Tobago |
| <input type="checkbox"/> HU Hungary | <input type="checkbox"/> UA Ukraine |
| <input type="checkbox"/> ID Indonesia | <input type="checkbox"/> UG Uganda |
| <input type="checkbox"/> IL Israel | <input checked="" type="checkbox"/> US United States of America |
| <input checked="" type="checkbox"/> JP Japan | <input type="checkbox"/> UZ Uzbekistan |
| <input type="checkbox"/> KE Kenya | <input type="checkbox"/> VN Viet Nam |
| <input type="checkbox"/> KG Kyrgyzstan | <input type="checkbox"/> YU Yugoslavia |
| <input type="checkbox"/> KP Democratic People's Republic of Korea | <input type="checkbox"/> ZW Zimbabwe |
| <input type="checkbox"/> KR Republic of Korea | |
| <input type="checkbox"/> KZ Kazakhstan | |
| <input type="checkbox"/> LC Saint Lucia | |
| <input type="checkbox"/> LK Sri Lanka | |
| <input type="checkbox"/> LR Liberia | |
| <input type="checkbox"/> LS Lesotho | |

Check-boxes reserved for designating States (for the purposes of a national patent) which have become party to the PCT after issuance of this sheet:

- ☐
- ☐
- ☐

In addition to the designations made above, the applicant also makes under Rule 4.9(b) all designations which would be permitted under the PCT except the designation(s) of
 applicant declares that those additional designations are subject to confirmation and that any designation which is not confirmed before the expiration of 15 months from the priority date is to be regarded as withdrawn by the applicant at the expiration of that time limit. (Confirmation of a designation consists of the filing of a notice specifying that designation and the payment of the designation and confirmation fees. Confirmation must reach the receiving Office within the 15-month time limit.)

Box No. VI PRIORITY CLAIM		Further priority claims are indicated in the Supplemental Box <input type="checkbox"/>	
The priority of the following earlier application(s) is hereby claimed:			
Country (in which, or for which, the application was filed)	Filing Date (day/month/year)	Application No.	Office of filing (only for regional or international application)
item (1)	()		
item (2)	()		
item (3)	()		
Mark the following check-box if the certified copy of the earlier application is to be issued by the Office which for the purposes of the present international application is the receiving Office (a fee may be required): <input type="checkbox"/> The receiving Office is hereby requested to prepare and transmit to the International Bureau a certified copy of the earlier application(s) identified above as item(s): _____			
Box No. VII INTERNATIONAL SEARCHING AUTHORITY			
Choice of International Searching Authority (ISA) (If two or more International Searching Authorities are competent to carry out the international search, indicate the Authority chosen; the two-letter code may be used): ISA/us			
Earlier search Fill in where a search (international, international-type or other) by the International Searching Authority has already been out or requested and the Authority is now requested to base the international search, to the extent possible, on the results of that earlier search. such search or request either by reference to the relevant application (or the translation thereof) or by reference to the search request: Country (or regional Office): _____ Date (day/month/year): _____ Number: _____			
Box No. VIII CHECK LIST			
This international application contains the following number of sheets: 1. request : 4 sheets 2. description : 21 sheets 3. claims : 7 sheets 4. abstract : 1 sheets 5. drawings : 9 sheets Total : 42 sheets		This international application is accompanied by the item(s) marked below: 1. <input type="checkbox"/> separate signed power of attorney 2. <input type="checkbox"/> copy of general power of attorney 3. <input type="checkbox"/> statement explaining lack of signature 4. <input type="checkbox"/> priority document(s) identified in Box No. VI as item(s): 5. <input checked="" type="checkbox"/> fee calculation sheet 6. <input type="checkbox"/> separate indications concerning deposited microorganisms 7. <input type="checkbox"/> nucleotide and/or amino acid sequence listing (diskette) 8. <input checked="" type="checkbox"/> other (specify): Transmittal Letter	
Figure No. _____ of the drawings (if any) should accompany the abstract when it is published.			
Box No. IX SIGNATURE OF APPLICANT OR AGENT			
Next to each signature, indicate the name of the person signing and the capacity in which the person signs (if such capacity is not obvious from reading the request).			
 _____ Paul J. Otterstedt (Agent)			

For receiving Office use only		2. Drawings: <input type="checkbox"/> received: <input type="checkbox"/> not received:
1. Date of actual receipt of the purported international application:		
3. Corrected date of actual receipt due to later but timely received papers or drawings completing the purported international application:		
4. Date of timely receipt of the required corrections under PCT Article 11(2):		
5. International Searching Authority specified by the applicant: ISA/	6. <input type="checkbox"/> Transmittal of search copy delayed until search fee is paid	

Date of receipt of the record copy by the International Bureau:	For International Bureau use only
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PCT

FEE CALCULATION SHEET

Annex to the Request

For receiving Office use only

International application No.

Date stamp of the receiving Office

Applicant's or agent's
file reference

31470-PCT

Applicant

THE RESEARCH FOUNDATION OF STATE UNIVERSITY OF NEW YORK

CALCULATION OF PRESCRIBED FEES

1. TRANSMITTAL FEE

240.00

T

2. SEARCH FEE

700.00

S

International search to be carried out by US

(If two or more International Searching Authorities are competent in relation to the international application, indicate the name of the Authority which is chosen to carry out the international search.)

3. INTERNATIONAL FEE

Basic Fee

The international application contains 42 sheets.

first 30 sheets

455.00

b₁

12 x \$10.00 =

120.00

b₂

remaining sheets additional amount

Add amounts entered at b₁ and b₂ and enter total at B

575.00

B

Designation Fees

The international application contains 3 designations.

3 x 105.00 =

315.00

D

number of designation fees amount of designation fee payable (maximum 11)

Add amounts entered at B and D and enter total at I

890.00

I

(Applicants from certain States are entitled to a reduction of 75% of the international fee. Where the applicant is (or all applicants are) so entitled, the total to be entered at I is 25% of the sum of the amounts entered at B and

4. FEE FOR PRIORITY DOCUMENT

P

5. TOTAL FEES PAYABLE

Add amounts entered at T, S, I and P, and enter total in the TOTAL box

1,830.00

TOTAL

☐ The designation fees are not paid at this time.

MODE OF PAYMENT

☐ authorization to charge
deposit account (see below)

☐ bank draft

☐ coupons

☒ cheque

☐ cash

☐ other (specify):

☐ postal money order

☐ revenue stamps

DEPOSIT ACCOUNT AUTHORIZATION (this mode of payment may not be available at all receiving Offices)

The RO/ US ☐ is hereby authorized to charge the total fees indicated above to my deposit account.

☒ is hereby authorized to charge any deficiency or credit any overpayment in the total fees indicated above to my deposit account.

☐ is hereby authorized to charge the fee for preparation and transmittal of the priority document to the International Bureau of WIPO to my deposit account.

02-4377

13 May 1998

Deposit Account Number

Date (day/month/year)

Signature

Paul J. Ottenstedt

PATENT COOPERATION TREATY

PCT/US98/09710

31470
PCT

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INFORMATION CONCERNING ELECTED OFFICES NOTIFIED OF THEIR ELECTION

(PCT Rule 61.3)

From the INTERNATIONAL BUREAU

To:

BAKER BOTTS L.L.P.

00 FEB 28 PM 12: 12

TANG, Henry
Baker & Botts, LLP
30 Rockefeller Plaza
New York, NY 10112-0228
ÉTATS-UNIS D'AMÉRIQUE

TO

Date of mailing (day/month/year)

16 February 2000 (16.02.00)

Applicant's or agent's file reference

31470-PCT

IMPORTANT INFORMATION

International application No.

PCT/US98/09710

International filing date (day/month/year)

13 May 1998 (13.05.98)

Priority date (day/month/year)

Applicant

THE RESEARCH FOUNDATION OF STATE UNIVERSITY OF NEW YORK et al

1. The applicant is hereby informed that the International Bureau has, according to Article 31(7), notified each of the following Offices of its election:

National :CA,JP,US

2. The following Offices have waived the requirement for the notification of their election; the notification will be sent to them by the International Bureau only upon their request:

None

3. The applicant is reminded that he must enter the "national phase" before the expiration of 30 months from the priority date before each of the Offices listed above. This must be done by paying the national fee(s) and furnishing, if prescribed, a translation of the international application (Article 39(1)(a)), as well as, where applicable, by furnishing a translation of any annexes of the international preliminary examination report (Article 36(3)(b) and Rule 74.1).

Some offices have fixed time limits expiring later than the above-mentioned time limit. For detailed information about the applicable time limits and the acts to be performed upon entry into the national phase before a particular Office, see Volume II of the PCT Applicant's Guide.

Docketed

For / 2000 by

The International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland

Facsimile No. (41-22) 740.14.35

Authorized officer:

F. Baechler

Telephone No. (41-22) 338.83.38

PATENT COOPERATION TREATY

PCT/US98/09710

31470

PCT

PCT

NOTIFICATION OF RECEIPT OF RECORD COPY

(PCT Rule 24.2(a))

From the INTERNATIONAL BUREAU RECEIVED

To:

BAKER & BOTTS, L.L.P.

98 JUL 10 PM 5: 16

TANG, Henry
Baker & Botts, LLP
30 Rockefeller Plaza
New York, NY 10112-0228
ETATS-UNIS D'AMERIQUE

[Handwritten signatures and initials]

Date of mailing (day/month/year) 15 June 1998 (15.06.98)	IMPORTANT NOTIFICATION
Applicant's or agent's file reference 31470-PCT	International application No. PCT/US98/09710

The applicant is hereby notified that the International Bureau has received the record copy of the international application as detailed below.

Name(s) of the applicant(s) and State(s) for which they are applicants:

THE RESEARCH FOUNDATION OF STATE UNIVERSITY OF NEW YORK (for all designated
States except US)
KAO, Imin et al (for US)

International filing date : 13 May 1998 (13.05.98)

Priority date(s) claimed :

Date of receipt of the record copy
by the International Bureau : 12 June 1998 (12.06.98)

List of designated Offices :

National : CA,JP,US

ATTENTION

The applicant should carefully check the data appearing in this Notification. In case of any discrepancy between these data and the indications in the international application, the applicant should immediately inform the International Bureau.

In addition, the applicant's attention is drawn to the information contained in the Annex, relating to:

- ☒ time limits for entry into the national phase;
- ☒ confirmation of precautionary designations;
- ☐ requirements regarding priority documents.

A copy of this Notification is being sent to the receiving Office and to the International Searching Authority.

ON DOCKET FOR

[Handwritten notes: 8/13/99. Pres. Dec. 1/13/00. Audlin]

[Handwritten: Copy to H-T]

[Handwritten: 7/27/98]

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland	Authorized officer: I. Britel
Facsimile No. (41-22) 740.14.35	Telephone No. (41-22) 338.83.38

INFORMATION ON TIME LIMITS FOR ENTERING THE NATIONAL PHASE

The applicant is reminded that the "national phase" must be entered before each of the designated Offices indicated in the Notification of Receipt of Record Copy (Form PCT/IB/301) by paying national fees and furnishing translations, as prescribed by the applicable national laws.

The time limit for performing these procedural acts is **20 MONTHS** from the priority date or, for those designated States which the applicant elects in a demand for international preliminary examination or in a later election, **30 MONTHS** from the priority date, provided that the election is made before the expiration of 19 months from the priority date. Some designated (or elected) Offices have fixed time limits which expire even later than 20 or 30 months from the priority date. In other Offices an extension of time or grace period, in some cases upon payment of an additional fee, is available.

In addition to these procedural acts, the applicant may also have to comply with other special requirements applicable in certain Offices. It is the applicant's responsibility to ensure that the necessary steps to enter the national phase are taken in a timely fashion. Most designated Offices do not issue reminders to applicants in connection with the entry into the national phase.

For detailed information about the procedural acts to be performed to enter the national phase before each designated Office, the applicable time limits and possible extensions of time or grace periods, and any other requirements, see the relevant Chapters of Volume II of the PCT Applicant's Guide. Information about the requirements for filing a demand for international preliminary examination is set out in Chapter IX of Volume I of the PCT Applicant's Guide.

GR and ES became bound by PCT Chapter II on 7 September 1996 and 6 September 1997, respectively, and may, therefore, be elected in a demand or a later election filed on or after 7 September 1996 and 6 September 1997, respectively, regardless of the filing date of the international application. (See second paragraph above.)

Note that only an applicant who is a national or resident of a PCT Contracting State which is bound by Chapter II has the right to file a demand for international preliminary examination.

CONFIRMATION OF PRECAUTIONARY DESIGNATIONS

This notification lists only specific designations made under Rule 4.9(a) in the request. It is important to check that these designations are correct. Errors in designations can be corrected where precautionary designations have been made under Rule 4.9(b). The applicant is hereby reminded that any precautionary designations may be confirmed according to Rule 4.9(c) before the expiration of 15 months from the priority date. If it is not confirmed, it will automatically be regarded as withdrawn by the applicant. There will be no reminder and no invitation. Confirmation of a designation consists of the filing of a notice specifying the designated State concerned (with an indication of the kind of protection or treatment desired) and the payment of the designation and confirmation fees. Confirmation must reach the receiving Office within the 15-month time limit.

REQUIREMENTS REGARDING PRIORITY DOCUMENTS

For applicants who have not yet complied with the requirements regarding priority documents the following is recalled.

Where the priority of an earlier national (i.e., national or regional) application is claimed, the applicant must submit a copy of the said national application, certified by the authority with which it was filed ("the priority document") to the receiving Office (which will transmit it to the International Bureau) or directly to the International Bureau, before the expiration of 16 months from the priority date (Rule 17.1).

Where the priority document is issued by the receiving Office, the applicant may, instead of submitting the priority document, request the receiving Office to prepare and transmit the priority document to the International Bureau. Such request must be made before the expiration of the 16-month time limit.

It is recalled that, where several priorities are claimed, the priority date to be considered for the purposes of computing the 16-month time limit is the filing date of the earliest application whose priority is claimed.

If the priority document concerned is not submitted to the International Bureau before the expiration of the 16-month time limit, or if the request to the receiving Office to transmit the priority document has not been made (and the corresponding fee, if any, paid) before the expiration of this time limit, any designated State may disregard the priority claim.

mcu 2/8/00

The demand must be filed directly with the competent International Preliminary Examining Authority or, if two or more Authorities are with the one chosen by the applicant. The full name or two-letter code of that Authority may be indicated by the applicant on the line

IPEA/ US

PCT

DEMAND

CHAPTER II

under Article 31 of the Patent Cooperation Treaty:
The undersigned requests that the international application specified below be the subject of international preliminary examination according to the Patent Cooperation Treaty and hereby elects all eligible States (except where otherwise indicated).

For International Preliminary Examining Authority use only

Identification of IPEA	Date of receipt of DEMAND
------------------------	---------------------------

Box No. I IDENTIFICATION OF THE INTERNATIONAL APPLICATION		Applicant's or agent's file reference 31470-PCT
International application No. PCT/US98/09710	International filing date (day/month/year) 13 May 1998 (13.05.98)	(Earliest) Priority date (day/month/year) ()

Title of invention
SHADOW MOIRE SURFACE MEASUREMENT USING TALBOT EFFECT

Box No. II APPLICANT(S)

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)

THE RESEARCH FOUNDATION OF STATE UNIVERSITY OF NEW YORK
P.O. Box 9
Albany, NY 12201-0009
US

Telephone No.:

Facsimile No.:

Teleprinter No.:

State (that is, country) of nationality:

US

State (that is, country) of residence:

US

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)

KAO, IMIN
17 Botany Lane
Stony Brook, NY 11790
US

State (that is, country) of nationality:

US

State (that is, country) of residence:

US

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)

CHIANG, FU-PEN
29 Acorn Lane
Stony Brook, NY 11790
US

State (that is, country) of nationality:

US

State (that is, country) of residence:

US

☐ Further applicants are indicated on a continuation sheet.

Box No. III AGENT OR COMMON REPRESENTATIVE; OR ADDRESS FOR CORRESPONDENCE

The following person is ☒ agent ☐ common representative
 and ☒ has been appointed earlier and represents the applicant(s) also for international preliminary examination.
☐ is hereby appointed and any earlier appointment of (an) agent(s) /common representative is hereby revoked.
☐ is hereby appointed, specifically for the procedure before the International Preliminary Examining Authority, in addition to the agent(s)/common representative appointed earlier.

Name and address: *(Family name followed by given name; for a legal entity, full official
The address must include postal code and name of country.)*

Telephone No.:
(212) 705-5000

TANG, HENRY
 Baker & Botts, LLP
 30 Rockefeller Plaza
 New York, NY 10112-0228
 US

Facsimile No.:
(212) 705-5020

Teleprinter No.:

☐ Address for correspondence: Mark this check-box where no agent or common representative is/has been appointed and the space above is used instead to indicate a special address to which correspondence should be sent.

Box No. IV BASIS FOR INTERNATIONAL PRELIMINARY EXAMINATION**Statement concerning amendments:***

1. The applicant wishes the international preliminary examination to start on the basis of:

☒ the international application as originally filed.

the description ☐ as originally filed
☐ as amended under Article 34

the claims ☐ as originally filed
☐ as amended under Article 19 (together with any accompanying statement)
☐ as amended under Article 34

the drawings ☐ as originally filed
☐ as amended under Article 34

2. ☐ The applicant wishes any amendment to the claims under Article 19 to be considered as reversed.

3. ☐ The applicant wishes the start of the international preliminary examination to be postponed until the expiration of 20 months from the priority date unless the International Preliminary Examining Authority receives a copy of any amendments made under Article 19 or a notice from the applicant that he does not wish to make such amendments (Rule 69.1(d)). *(This check-box may be marked only where the time limit under Article 19 has not yet expired.)*

* Where no check-box is marked, international preliminary examination will start on the basis of the international application as originally filed or, where a copy of amendments to the claims under Article 19 and/or amendments of the international application under Article 34 are received by the International Preliminary Examining Authority before it has begun to draw up a written opinion or the international preliminary examination report, as so amended.

Language for the purposes of international preliminary examination: English

- ☒ which is the language in which the international application was filed.
☐ which is the language of a translation furnished for the purposes of international search.
☐ which is the language of publication of the international application.
☐ which is the language of the translation (to be) furnished for the purposes of international preliminary examination.

Box No. V ELECTION OF STATES

The applicant hereby elects all eligible States *(that is, all States which have been designated and which are bound by Chapter II of the PCT)*

excluding the following States which the applicant wishes not to elect:

Box No. VI CHECK LIST

The demand is accompanied by the following elements, in the language referred to in Box No. IV, for the purposes of international preliminary examination:

- | | | |
|---|---|--------|
| 1. translation of international application | : | sheets |
| 2. amendments under Article 34 | : | sheets |
| 3. copy (or where required, translation) of amendments under Article 19 | : | sheets |
| 4. copy (or, where required, translation) of statement under Article 19 | : | sheets |
| 5. letter | : | sheets |
| 6. other (<i>specify</i>) | : | sheets |

For International Preliminary Examining Authority use only

received not received

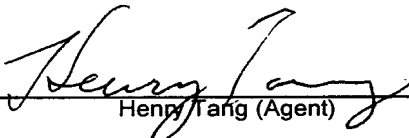
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>

The demand is also accompanied by the item(s) marked below:

- | | |
|--|---|
| 1. <input checked="" type="checkbox"/> fee calculation sheet | 4. <input type="checkbox"/> statement explaining lack of signature |
| 2. <input type="checkbox"/> separate signed power of attorney | 5. <input type="checkbox"/> nucleotide and or amino acid sequence listing in computer readable form |
| 3. <input type="checkbox"/> copy of general power of attorney; reference number, if any: | 6. <input checked="" type="checkbox"/> other (<i>specify</i>): Transmittal Letter |

Box No. VII SIGNATURE OF APPLICANT, AGENT OR COMMON REPRESENTATIVE

Next to each signature, indicate the name of the person signing and the capacity in which the person signs (if such capacity is not obvious from reading the demand).


 Henry Tang (Agent)

For International Preliminary Examining Authority use only

- | | |
|--|---|
| 1. Date of actual receipt of DEMAND: | |
| 2. Adjusted date of receipt of demand due to CORRECTIONS under Rule 60.1(b): | |
| 3. <input type="checkbox"/> The date of receipt of the demand is AFTER the expiration of 19 months from the priority date and item 4 or 5, below, does not apply. | <input type="checkbox"/> The applicant has been informed accordingly. |
| 4. <input type="checkbox"/> The date of receipt of the demand is WITHIN the period of 19 months from the priority date as extended by virtue of Rule 80.5. | |
| 5. <input type="checkbox"/> Although the date of receipt of the demand is after the expiration of 19 months from the priority date, the delay in arrival is EXCUSED pursuant to Rule 82. | |

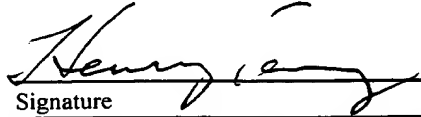
For International Bureau use only

Demand received from IPEA on:

PCT

FEE CALCULATION SHEET

Annex to the Demand for international preliminary examination

International application No. PCT/US98/09710	For International Preliminary Examining Authority use only	
Applicant's or agent's file reference 31470-PCT	Date stamp of the IPEA	
Applicant THE RESEARCH FOUNDATION OF STATE UNIVERSITY OF NEW YORK		
Calculation of prescribed fees		
1. Preliminary examination fee	490.00	<input type="checkbox"/> P
2. Handling fee <i>(Applicants from certain States are entitled to a reduction of 75% of the handling fee. Where the applicant is (or all applicants are) so entitled, the amount to be entered at H is 25% of the handling fee.)</i>	162.00	<input type="checkbox"/> H
3. Total of prescribed fees Add the amounts entered at P and H and enter total in the TOTAL box	<div style="border: 1px solid black; display: inline-block; padding: 5px;"> 652.00 </div>	
<div style="border: 1px solid black; display: inline-block; padding: 5px;"> TOTAL </div>		
Mode of Payment		
<input checked="" type="checkbox"/> authorization to charge deposit account with the IPEA (see below)	<input type="checkbox"/> cash	
<input checked="" type="checkbox"/> cheque	<input type="checkbox"/> revenue stamps	
<input type="checkbox"/> postal money order	<input type="checkbox"/> coupons	
<input type="checkbox"/> bank draft	<input type="checkbox"/> other (specify):	
Deposit Account Authorization <i>(this mode of payment may not be available at all IPEAs)</i>		
The IPEA/ <u>US</u> <input type="checkbox"/> is hereby authorized to charge the total fees indicated above to my deposit account.		
<input checked="" type="checkbox"/> <i>(this check-box may be marked only if the conditions for deposit accounts of the IPEA so permit)</i> is hereby authorized to charge any deficiency or credit any overpayment in the total fees indicated above to my deposit account.		
02-4377	10 December 1999	
Deposit Account Number	Date (day/month/year)	Signature

PATENT COOPERATION TREATY

WO 99/58952
PCT/US98/09710

31470
PCT

PCT

From the INTERNATIONAL BUREAU

NOTICE INFORMING THE APPLICANT OF THE COMMUNICATION OF THE INTERNATIONAL APPLICATION TO THE DESIGNATED OFFICES

(PCT Rule 47.1(c), first sentence)

To:

TANG, Henry
Baker & Botts, LLP
30 Rockefeller Plaza
New York, NY 10112-0228
ÉTATS-UNIS D'AMÉRIQUE

RECEIVED
BAKER & BOTTS, LLP

NOV 29 PM 3: 26

HUTNEY

Date of mailing (day/month/year)

18 November 1999 (18.11.99)

Applicant's or agent's file reference

31470-PCT

IMPORTANT NOTICE

International application No.

PCT/US98/09710

International filing date (day/month/year)

13 May 1998 (13.05.98)

Priority date (day/month/year)

Applicant

THE RESEARCH FOUNDATION OF STATE UNIVERSITY OF NEW YORK et al

1. Notice is hereby given that the International Bureau has communicated, as provided in Article 20, the international application to the following designated Offices on the date indicated above as the date of mailing of this Notice:

JP,US

In accordance with Rule 47.1(c), third sentence, those Offices will accept the present Notice as conclusive evidence that the communication of the international application has duly taken place on the date of mailing indicated above and no copy of the international application is required to be furnished by the applicant to the designated Office(s).

2. The following designated Offices have waived the requirement for such a communication at this time:

CA

The communication will be made to those Offices only upon their request. Furthermore, those Offices do not require the applicant to furnish a copy of the international application (Rule 49.1(a-bis)).

3. Enclosed with this Notice is a copy of the international application as published by the International Bureau on

18 November 1999 (18.11.99) under No. WO 99/58952

REMINDER REGARDING CHAPTER II (Article 31(2)(a) and Rule 54.2)

If the applicant wishes to postpone entry into the national phase until 30 months (or later in some Offices) from the priority date, a demand for international preliminary examination must be filed with the competent International Preliminary Examining Authority before the expiration of 19 months from the priority date.

It is the applicant's sole responsibility to monitor the 19-month time limit.

Note that only an applicant who is a national or resident of a PCT Contracting State which is bound by Chapter II has the right to file a demand for international preliminary examination.

REMINDER REGARDING ENTRY INTO THE NATIONAL PHASE (Article 22 or 39(1))

If the applicant wishes to proceed with the international application in the national phase, he must, within 20 months or 30 months, or later in some Offices, perform the acts referred to therein before each designated or elected Office.

For further important information on the time limits and acts to be performed for entering the national phase, see the Annex to Form PCT/IB/301 (Notification of Receipt of Record Copy) and Volume II of the PCT Applicant's Guide.

Docketed

The International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland

Facsimile No. (41-22) 740.14.35

Authorized officer

J. Zahra

Telephone No. (41-22) 338.83.38

For 13/2000 by

PATENT COOPERATION TREATY

BAKER BOTTS L.L.P.

From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

PCT

00 APR -4 PM 12: 55

TO

WRITTEN OPINION

(PCT Rule 66)

To: HENRY TANG
BAKER AND BOTTS, LLP
30 ROCKEFELLER PLAZA
NEW YORK, NY 10112-0228

Date of Mailing
(day/month/year)

30 MAR 2000

Applicant's or agent's file reference

31470-PCT

REPLY-DUE

within TWO months
from the above date of mailing

International application No.

PCT/US98/09710

International filing date (day/month/year)

13 MAY 1998

Priority date (day/month/year)

NONE

International Patent Classification (IPC) or both national classification and IPC
IPC(6): G01N 11/30 and US Cl.: 356/371

Applicant

THE RESEARCH FOUNDATION OF STATE UNIVERSITY OF NEW YORK

1. This written opinion is the first (first, etc.) drawn by this International Preliminary Examining Authority.

2. This opinion contains indications relating to the following items:

- I ☒ Basis of the opinion
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step or industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability: citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Docketed

For 5/13/2000 By *[Signature]*

3. The applicant is hereby invited to reply to this opinion.

When? See the time limit indicated above. ~~The applicant may, before the expiration of that time limit, request this Authority to grant an extension, see Rule 66.2(d).~~

How? By submitting a written reply, accompanied, where appropriate, by amendments, according to Rule 66.3. For the form and the language of the amendments, see Rules 66.8 and 66.9.

Also For an additional opportunity to submit amendments, see Rule 66.4.
For the examiner's obligation to consider amendments and/or arguments, see Rule 66.4 bis.
For an informal communication with the examiner, see Rule 66.6.

If no reply is filed, the international preliminary examination report will be established on the basis of this opinion.

4. The final date by which the international preliminary examination report must be established according to Rule 69.2 is: 13 SEPTEMBER 2000

Name and mailing address of the IPEA/US
Commissioner of Patents and Trademarks
Box PCT
Washington, D.C. 20231

Facsimile No. (703) 305-3230

Authorized officer

RICHARD ROSENBERG

Telephone No. (703) 308-0956

WRITTEN OPINION

International application No.

PCT/US98/09710

I. Basis of the opinion

1. This opinion has been drawn on the basis of *(Substitute sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this opinion as "originally filed".)*:

☒ the international application as originally filed.

☒ the description, pages 1-21 , as originally filed.

pages NONE , filed with the demand.

pages NONE , filed with the letter of _____.

☒ the claims, Nos. 1-24 , as originally filed.

Nos. NONE , as amended under Article 19.

Nos. NONE , filed with the demand.

Nos. NONE , filed with the letter of _____.

☒ the drawings, sheets/~~fig~~ 1-8 , as originally filed.

sheets/~~fig~~ NONE , filed with the demand.

sheets/~~fig~~ NONE , filed with the letter of _____.

2. The amendments have resulted in the cancellation of:

☒ the description, pages none

☒ the claims, Nos. none

☒ the drawings, sheets/~~fig~~ none

3. ☐ This opinion has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the ~~Supplemental Box~~ Additional observations below (Rule 70.2(c)).

4. Additional observations, if necessary:

NONE

WRITTEN OPINION

International application No.

PCT/US98/09710

V. Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**1. STATEMENT**

Novelty (N)	Claims <u>1-24</u>	YES
	Claims <u>none</u>	NO
Inventive Step (IS)	Claims <u>none</u>	YES
	Claims <u>1-24</u>	NO
Industrial Applicability (IA)	Claims <u>1-24</u>	YES
	Claims <u>none</u>	NO

2. CITATIONS AND EXPLANATIONS

Claims 1-24 lack an inventive step under PCT Article 33(3) as being obvious over Pike (US 5,311,286) in view of Hamada et al (US 5,062,094) and Matsui (US 4,979,827). Pike shows measuring a surface with a system such as claimed, but does not specifically mention that the distance between the reference grating and a mean plane surface of the object be chosen to be a Talbot distance. However, it is known in the art that, with moire based measuring systems that a Talbot distance is particularly advantageous; see Hamada et al, column 5, lines 7-15; which discloses that the Talbot distance is chosen "for producing a clear moire pattern", and that the Talbot distance "is a distance that provides a clear Fourier image". See also Matsui, the paragraph bridging columns 1 and 2, which mentions that it is known in the art to maintain a separation in accordance with the instant claimed relationship. It would therefore have been obvious to choose a Talbot distance for the spacing of Pike since the Talbot distance is known to be an especially advantageous distance for moire fringe generation.

----- NEW CITATIONS -----

NONE

WRITTEN OPINION

International application No.

PCT/US98/09710

Supplemental Box

(To be used when the space in any of the preceding boxes is not sufficient)

Continuation of: Boxes I - VIII

Sheet 10

TIME LIMIT:

The time limit set for response to a Written Opinion may not be extended. 37 CFR 1.484(d). Any response received after the expiration of the time limit set in the Written Opinion will not be considered in preparing the International Preliminary Examination Report.

Patent

IN THE INTERNATIONAL RECEIVING OFFICE

Applicant : The Research Foundation of State University of New York

Serial No.: PCT/US98/09710

Filed : 13 May 1998

For : **SURFACE MEASUREMENT USING SHADOW
MOIRE TECHNIQUE WITH TALBOT EFFECT**

REPLY TO WRITTEN OPINION**VIA FACSIMILE
ORIGINAL BY EXPRESS MAIL
EXPRESS MAIL NO.: EJ339573881US****Hon. Commissioner of Patents and Trademarks
BOX PCT
Washington DC 20231**

Dear Sir:

In accordance with PCT Rules 66.3, 66.8 and 66.9, applicant submits this reply to the Written Opinion dated 30 March, 2000 in the above-referenced application.

Remarks

The International Examiner has opined that each of claims 1-24 of the present application lack an inventive step under PCT Article 33(3) as being obvious over U.S. Patent No. 5,311,286 to Pike in view of U.S. Patent No. 5,062,094 to Hamada et al. and U.S. Patent No. 4,979,827 to Matsui. Specifically, the Examiner has opined that it would have been obvious to choose a Talbot distance for the spacing in the Pike reference since the Talbot distance is known to be especially advantageous for moire fringe generation. For the reasons set forth below, Applicant respectfully submits that the Examiner's opinions concerning lack of inventive step are erroneous and that the invention set forth in claims 1-24 is patentably distinct from the cited art.

Claim 1 is directed to enhancing a shadow moire technique via the Talbot effect. More specifically, claim 1 discloses a method for surface measurement which includes: providing a specimen having a surface to be measured, supporting a

reference grating at a Talbot distance from the mean surface plane of the specimen, causing a beam of light to be directed through the reference grating onto the surface to be measured, thus casting a reference grating shadow which functions as an effective specimen grating, and then detecting moire fringes produced by the reference grating and the effective specimen grating. Claim 15 contains similar elements but in apparatus claim format. As disclosed in the specification at page 4, the claimed invention permits fast and concurrent measurement of a surface, without any dynamic effects or mounting distortion, over the full-field or the whole surface of the wafer. Furthermore, this method can be automated, can be applied to other types of surface measurements, and permits measurement of very fine surface features that are typically encountered with substrate wafers for electronic devices.

No such method or apparatus is disclosed in or suggested by Pike, either alone or in combination with Hamada et al. and/or Matsui. The Pike reference discloses a technique for measuring the roughness of a surface. However, as recognized by the International Examiner, the reference neither discloses or suggests that the distance between a reference grating member and a planar surface to be measured should be chosen to be a Talbot distance. Accordingly, the Pike reference does not and cannot obviate the invention of the present application.

Neither of the secondary references cited by the Examiner make up for this deficiency. The first reference, Hamada et al., discloses an optical head system that is used for recording or reproducing information. One of the system's key features is the use of multiple gratings; in fact, all of the claims require the use of two or more gratings. Thus, while column 5, lines 7-15 of the Hamada et al. reference disclose spacing of *two diffraction gratings* at a so called "Talbot" distance in order to produce a clear moire pattern and provide a clear Fourier image, nothing in the reference discloses or suggests spacing *one* grating member and a surface to be measured by the Talbot distance, as required by Independent claims 1 and 15. Nothing in the reference would motivate a person of ordinary skill in the art to achieve the present invention as Hamada et al.'s discussion of a Talbot distance in producing a moire pattern relates only to systems such as the one described in the reference where multiple gratings are used in an optical disk system.

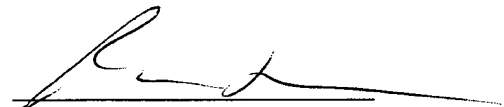
With respect to the Matsui reference, that reference discloses an averaged diffraction moire position detector having a pair of diffraction gratings. As with the Hamada et al. reference, Matsui fails to disclose or suggest the spacing of one grating member from a surface to be measured at the Talbot distance.

Indeed, Matsui actually teaches away from the use of a Talbot distance. In the passage cited by the Examiner, the reference discloses the difficulty of surely holding two diffraction gratings having longitudinal separated positions of a distance $2P^2/\lambda$ (a Talbot distance) when the distance to be measured is made long and grating pitch P is made short. The same passage also discloses that diffraction moire fringes cannot be used to finely measure distances between two members of generally used machine tools. While the present invention is not specifically directed to measurements of distances between two members of generally used machine tools, the method of the present invention does measure the variation in the depth of the surface to be measured. Thus, Applicant submits that Matsui teaches away from the use of a Talbot distance in a system like the one described in the present application.

In view of the foregoing, the International Examiner's written opinion concerning the lack of inventive step in claims 1-24 of the present application is respectfully traversed. It is submitted that the claims as presently drafted meet the requirements of PCT Article 33(3).

Respectfully submitted,

Dated: May 30, 2000



Henry Tang
Reg. No. 29,705

Paul A. Ragusa
Reg. No. 38,587

Attorneys for Applicant
(212) 408-2500

Enclosures

PATENT COOPERATION TREATY

PCT

RECORDED 07 AUG 2000

INFO

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 31470-PCT	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/US98/09710	International filing date (day/month/year) 13 MAY 1998	Priority date (day/month/year) NONE
International Patent Classification (IPC) or national classification and IPC IPC(6): G01N 11/30 and US Cl.: 356/371		
Applicant THE RESEARCH FOUNDATION OF STATE UNIVERISTY OF NEW YORK		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 4 sheets.

☐ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority. (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 0 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of report with regard to novelty, inventive step or industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand 10 DECEMBER 1999	Date of completion of this report 25 JULY 2000
Name and mailing address of the IPEA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231	Authorized officer RICHARD ROSENBERGER
Facsimile No. (703) 305-3230	Telephone No. (703) 308-0959

I. Basis of the report**1. With regard to the elements of the international application:***☒ the international application as originally filed☒ the description:

pages 1-21, as originally filed

pages NONE, filed with the demand

pages NONE, filed with the letter of

☒ the claims:

pages 22-28, as originally filed

pages NONE, as amended (together with any statement) under Article 19

pages NONE, filed with the demand

pages NONE, filed with the letter of

☒ the drawings:

pages 1-8, as originally filed

pages NONE, filed with the demand

pages NONE, filed with the letter of

☒ the sequence listing part of the description:

pages NONE, as originally filed

pages NONE, filed with the demand

pages NONE, filed with the letter of

2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language _____ which is:

☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).☐ the language of publication of the international application (under Rule 48.3(b)).☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).**3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:**☐ contained in the international application in printed form.☐ filed together with the international application in computer readable form.☐ furnished subsequently to this Authority in written form.☐ furnished subsequently to this Authority in computer readable form.☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.**4. ☒ The amendments have resulted in the cancellation of:**☒ the description, pages none☒ the claims, Nos. none☒ the drawings, sheets/fig none**5. ☒ This report has been drawn as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).****

* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).

**Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/US98/09710

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. statement

Novelty (N)	Claims <u>1-24</u>	YES
	Claims <u>none</u>	NO
Inventive Step (IS)	Claims <u>none</u>	YES
	Claims <u>1-24</u>	NO
Industrial Applicability (IA)	Claims <u>1-24</u>	YES
	Claims <u>none</u>	NO

2. citations and explanations (Rule 70.7)

Claims 1-24 lack an inventive step under PCT Article 33(3) as being obvious over Pike (US 5,311,286) in view of Hamada et al (US 5,062,094) and Matsui (US 4,979,827). Pike shows measuring a surface with a system such as claimed, but does not specifically mention that the distance between the reference grating and a mean plane surface of the object be chosen to be a Talbot distance. However, it is known in the art that, with Moire based measuring systems that a Talbot distance is particularly advantageous; see Hamada et al, column 5, lines 7-15; which discloses that the Talbot distance is chosen "for producing a clear moire pattern", and that the Talbot distance "is a distance that provides a clear Fourier image". See also Matsui, the paragraph bridging columns 1 and 2, which mentions that it is known in the art to maintain a separation in accordance with the instant claimed relationship. Hamada et al and Matsui discuss the distance between two gratings; in Pike (and in the instant invention) the projected shadow pattern of the grating on the surface is a first effective grating located at the surface being measured and the grating itself between the surface and the detector is a second grating, with the distance between the two gratings thus being the distance between the surface (the first effective grating) and the grating itself. It would have been obvious to choose a Talbot distance for the spacing between the surface and the grating in the arrangement of Pike since the Talbot distance for such Moire-based system is known to be an especially advantageous distance for Moire fringe generation.

----- NEW CITATIONS -----
NONE

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/US98/09710

Supplemental Box

(To be used when the space in any of the preceding boxes is not sufficient)

Continuation of: Boxes I - VIII

Sheet 10

I. BASIS OF REPORT:

5. (Some) amendments are considered to go beyond the disclosure as filed:

NONE

PATENT COOPERATION TREATY

From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

To: HENRY TANG
BAKER AND BOTTS, LLP
30 ROCKEFELLER PLAZA
NEW YORK, NY 10112-0228

PCT

NOTIFICATION OF TRANSMITTAL OF INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Rule 71.1)

HT
PAK
MCU

Date of Mailing
(day/month/year)

03 AUG 2000

Applicant's or agent's file reference

31470-PCT

IMPORTANT NOTIFICATION

International application No.

PCT/US98/09710

International filing date (day/month/year)

13 MAY 1998

Priority Date (day/month/year)

NONE

Applicant

THE RESEARCH FOUNDATION OF STATE UNIVERISTY OF NEW YORK

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary examination report and its annexes, if any, established on the international application.
2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.
4. **REMINDER**

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices)(Article 39(1))(see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

ONE DOZEN FOR *18*

11/13/00

Name and mailing address of the IPEA/US
Commissioner of Patents and Trademarks
Box PCT
Washington, D.C. 20231

Facsimile No. (703) 305-3230

Authorized officer

RICHARD ROSENBERGER

Telephone No. (703) 308-0950

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 31470-PCT	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/US98/09710	International filing date (day/month/year) 13 MAY 1998	Priority date (day/month/year) NONE
International Patent Classification (IPC) or national classification and IPC IPC(6): G01N 11/30 and US Cl.: 356/371		
Applicant THE RESEARCH FOUNDATION OF STATE UNIVERISTY OF NEW YORK		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 4 sheets.
- ☐ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority. (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).
- These annexes consist of a total of 0 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of report with regard to novelty, inventive step or industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand 10 DECEMBER 1999	Date of completion of this report 25 JULY 2000
Name and mailing address of the IPEA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231	Authorized officer RICHARD ROSENBERG
Facsimile No. (703) 305-3230	Telephone No. (703) 308-0950

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**1. statement**

Novelty (N)

Claims 1-24 YESClaims none NO

Inventive Step (IS)

Claims none YESClaims 1-24 NO

Industrial-Applicability (IA)

Claims 1-24 YESClaims none NO**2. citations and explanations (Rule 70.7)**

Claims 1-24 lack an inventive step under PCT Article 33(3) as being obvious over Pike (US 5,311,286) in view of Hamada et al (US 5,062,094) and Matsui (US 4,979,827). Pike shows measuring a surface with a system such as claimed, but does not specifically mention that the distance between the reference grating and a mean plane surface of the object be chosen to be a Talbot distance. However, it is known in the art that, with Moire based measuring systems that a Talbot distance is particularly advantageous; see Hamada et al, column 5, lines 7-15; which discloses that the Talbot distance is chosen "f or producing a clear moire pattern", and that the Talbot distance "is a distance that provides a clear Fourier image". See also Matsui, the paragraph bridging columns 1 and 2, which mentions that it is known in the art to maintain a separation in accordance with the instant claimed relationship. Hamada et al and Matsui discuss the distance between two gratings; in Pike (and in the instant invention) the projected shadow pattern of the grating on the surface is a first effective grating located at the surface being measured and the grating itself between the surface and the detector is a second grating, with the distance between the two gratings thus being the distance between the surface (the first effective grating) and the grating itself. It would have been obvious to choose a Talbot distance for the spacing between the surface and the grating in the arrangement of Pike since the Talbot distance for such Moire-based system is known to be an especially advantageous distance for Moire fringe generation.

----- NEW CITATIONS -----
NONE

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/US98/09710

Supplemental Box

(To be used when the space in any of the preceding boxes is not sufficient)

Continuation of: Boxes I - VIII

Sheet 10

I. BASIS OF REPORT:

5. (Some) amendments are considered to go beyond the disclosure as filed:

NONE

PATENT COOPERATION TREATY

31470-PCT

From the INTERNATIONAL SEARCHING AUTHORITY

To: HENRY TANG BAKER AND BOTTS, LLP 30 ROCKEFELLER PLAZA NEW YORK, NY 10112-0228

PCT

RECEIVED
BAKER & BOTTS, LLP
NOTIFICATION OF TRANSMITTAL OF
THE INTERNATIONAL SEARCH REPORT
OR THE DECLARATION

(PCT Rule 44.1)

Date of Mailing
 (day/month/year) **04 AUG 1998**

Applicant's or agent's file reference 31470-PCT	FOR FURTHER ACTION See paragraphs 1 and 4 below
International application No. PCT/US98/09710	International filing date (day/month/year) 13 MAY 1998
Applicant THE RESEARCH FOUNDATION OF STATE UNIVERSITY OF NEW YORK	

1. ☒ The applicant is hereby notified that the international search report has been established and is transmitted herewith.

Filing of amendments and statement under Article 19:

The applicant is entitled, if he so wishes, to amend the claims of the international application (see Rule 46):

When? The time limit for filing such amendments is normally 2 months from the date of transmittal of the international search report; however, for more details, see the notes on the accompanying sheet.

Where? Directly to the International Bureau of WIPO
 34, chemin des Colombettes
 1211 Geneva 20, Switzerland
 Facsimile No.: (41-22) 740.14.35

For more detailed instructions, see the notes on the accompanying sheet.

RECEIVED
 FOR 10/4/98
 WIP

2. ☐ The applicant is hereby notified that no international search report will be established and that the declaration under Article 17(2)(a) to that effect is transmitted herewith.

3. ☐ With regard to the protest against payment of (an) additional fee(s) under Rule 40.2, the applicant is notified that:

- ☐ the protest together with the decision thereon has been transmitted to the International Bureau together with the applicant's request to forward the texts of both the protest and the decision thereon to the designated Offices.
☐ no decision has been made yet on the protest; the applicant will be notified as soon as a decision is made.

4. **Further action(s):** The applicant is reminded of the following:

Shortly after 18 months from the priority date, the international application will be published by the International Bureau. If the applicant wishes to avoid or postpone publication, a notice of withdrawal of the international application, or of the priority claim, must reach the International Bureau as provided in rules 90 bis 1 and 90 bis 3, respectively, before the completion of the technical preparations for international publication.

Within 19 months from the priority date, a demand for international preliminary examination must be filed if the applicant wishes to postpone the entry into the national phase until 30 months from the priority date (in some Offices even later).

Within 20 months from the priority date, the applicant must perform the prescribed acts for entry into the national phase before all designated Offices which have not been elected in the demand or in a later election within 19 months from the priority date or could not be elected because they are not bound by Chapter II.

Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703) 305-3230	Authorized officer <div style="text-align: center;"> RICHARD ROSENBERGER </div> Telephone No. (703) 308-0956
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PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference 31470-PCT	<div style="display: flex; justify-content: space-between;"> <div> FOR FURTHER ACTION </div> <div> see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below. </div> </div>	
International application No. PCT/US98/09710	International filing date (<i>day/month/year</i>) 13 MAY 1998	(Earliest) Priority Date (<i>day/month/year</i>) NONE
Applicant THE RESEARCH FOUNDATION OF STATE UNIVERISTY OF NEW YORK		

This international search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 3 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. ☐ Certain claims were found unsearchable (See Box I).

2. ☐ Unity of invention is lacking (See Box II).

3. ☐ The international application contains disclosure of a nucleotide and/or amino acid sequence listing and the international search was carried out on the basis of the sequence listing

☐ filed with the international application.
☐ furnished by the applicant separately from the international application,

☐ but not accompanied by a statement to the effect that it did not include matter going beyond the disclosure in the international application as filed.

☐ transcribed by this Authority.

4. With regard to the title,

☐ the text is approved as submitted by the applicant.
☒ the text has been established by this Authority to read as follows:

The title exceeds the 2-7 word recommendation of PCT Rule 4.3. The new title is:

Shadow Moire Surface Measurement Using Talbot Effect

5. With regard to the abstract,

☐ the text is approved as submitted by the applicant.
☒ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the drawings to be published with the abstract is:

Figure No. 1

☐ as suggested by the applicant.
☒ because the applicant failed to suggest a figure.
☐ because this figure better characterizes the invention.

☐ None of the figures.

Box III TEXT OF THE ABSTRACT (Continuation of item 5 of the first sheet)

The technical features mentioned in the abstract do not include a reference sign between parentheses (PCT Rule 8.1(d)).

The abstract is too long (PCT Rule 8.1(b)). The abstract must be less than 150 words, or 200 words when no Figure is to be published.

NEW ABSTRACT

A method and apparatus for surface measurement using the shadow moire effect with the Talbot effect. The apparatus (10) includes a specimen mount (18) to receive a specimen (12) having a surface (14) to be measured, and a reference grating (22) mounted adjacent the specimen mount (18) so as to be substantially parallel to a mean surface plane (16) of the specimen (12). The reference grating (22) is mounted in such a manner that the distance between the reference grating (22) and the mean surface plane (16) of the specimen (12) can be adjusted to a Talbot distance δT . The apparatus also includes a light source (28) to illuminate the specimen (12) through the grating (22), and a detector (36) positioned to detect the moire fringes produced by the grating (22) due to variation of the surface of the specimen (12).

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US98/09710

A. CLASSIFICATION OF SUBJECT MATTER

IPC(6) :G01N 11/30

US CL :356/371

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 356/371, 374, 376

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5,311,286 A (PIKE) 10 May 1994 (10/05/94)., Figure 1	1-24
Y	US 4,979,827 A (MATSUI) 25 December 1990 (25/12/90), column 1, line 54 through column 2, line 9.	1-24
Y	US 5,062,094 A (HAMADA et al) 29 October 1991 (29/10/91), column 5, lines 7-9.	1-24



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents:	*T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
A document defining the general state of the art which is not considered to be of particular relevance	*X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
E earlier document published on or after the international filing date	*Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
L document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	*A* document member of the same patent family
O document referring to an oral disclosure, use, exhibition or other means	
P document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search

17 JULY 1998

Date of mailing of the international search report

04 AUG 1998

Name and mailing address of the ISA/US
Commissioner of Patents and Trademarks
Box PCT
Washington, D.C. 20231

Facsimile No. (703) 305-3230

Authorized officer

RICHARD ROSENBERGER

Telephone No. (703) 308-0956

NOTES TO FORM PCT/ISA/220

These Notes are intended to give the basic instructions concerning the filing of amendments under Article 19. The Notes are based on the requirements of the Patent Cooperation Treaty and of the Regulations and the Administrative Instructions under that Treaty. In case of discrepancy between these Notes and those requirements, the latter are applicable. For more detailed information, see also the PCT Applicant's Guide, a publication of WIPO.

In these Notes, "Article", "Rule" and "Section" refer to the provisions of the PCT, the PCT Regulations and the PCT Administrative Instructions, respectively.

INSTRUCTIONS CONCERNING AMENDMENTS UNDER ARTICLE 19

The applicant has, after having received the international search report, one opportunity to amend the claims of the international application. It should however be emphasized that, since all parts of the international application (claims, description and drawings) may be amended during the international preliminary examination procedure, there is usually no need to file amendments of the claims under Article 19 except where, e.g. the applicant wants the latter to be published for the purposes of provisional protection or has another reason for amending the claims before international publication. Furthermore, it should be emphasized that provisional protection is available in some States only.

What parts of the international application may be amended ?

The claims only.

The description and the drawings may only be amended during international preliminary examination under Chapter II.

When ? Within 2 months from the date of transmittal of the international search report or 16 months from the priority date, whichever time limit expires later. It should be noted, however, that the amendments will be considered as having been received on time if they are received by the International Bureau after the expiration of the applicable time limit but before the completion of the technical preparations for international publication (Rule 46.1).

Where not to file the amendments ?

The amendments may only be filed with the International Bureau and not with the receiving Office or the International Searching Authority (Rule 46.2).

Where a demand for international preliminary examination has been/is filed, see below.

How ? Either by cancelling one or more entire claims, by adding one or more new claims or by amending the text of one or more of the claims as filed.

A replacement sheet must be submitted for each sheet of the claims which, on account of an amendment or amendments, differs from the sheet originally filed.

All the claims appearing on a replacement sheet must be numbered in Arabic numerals. Where a claim is cancelled, no renumbering of the other claims is required. In all cases where claims are renumbered, they must be renumbered consecutively (Administrative Instructions, Section 205(b)).

What documents must/may accompany the amendments ?

Letter (Section 205(b)):

The amendments must be submitted with a letter.

The letter will not be published with the international application and the amended claims. It should not be confounded with the "Statement under Article 19(1)" (see below, under "Statement under Article 19(1)").

The letter must indicate the differences between the claims as filed and the claims as amended. It must, in particular, indicate, in connection with each claim appearing in the international application (it being understood that identical indications concerning several claims may be grouped), whether

- (i) the claim is unchanged;
- (ii) the claim is cancelled;
- (iii) the claim is new;
- (iv) the claim replaces one or more claims as filed;
- (v) the claim is the result of the division of a claim as filed.